

CERTIFICATE OF MAILING

I hereby certify that this Transmittal is being deposited with the U.S. Postal Service, with sufficient postage, in an envelope addressed to the Board of Patent Appeals, Washington, D.C. 20231, on this 31st day of July 2000.

Carole Guacomazza

PATENT

#9/appeal
Brief
8-16-00
Jones

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Gedney et al)
Serial No. 09/004,524)
Filed: January 8, 1998)
For: **IC CHIP ATTACHMENT**)
Reissue of U.S. Patent No. 5,483,421)

Examiner: J. Vigushin

Art Unit 2835 2841

Attorney Docket No.: IEN-10-5342-R (EN9-91-022R)

TRANSMITTAL OF APPEAL BRIEF

Board of Patent Appeals
Assistant Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

1. Transmitted herewith in triplicate is the APPEAL BRIEF in this application with respect to the Notice of Appeal filed on May 31, 2000.

Note: "The applicant shall, within 2 months from the date of the notice of appeal under § 1.191 in an application, reissue application, or patent under reexamination, or within the time allowed for response to the action appealed from, if such time is later, file a brief in triplicate." 37 C.F.R. 1.192(a) [emphasis added].

2. **STATUS OF APPLICATION**

This application is on behalf of

- ☒ other than a small entity
☐ small entity

Verified statement:

- ☐ attached
☐ already filed

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3. **FEE FOR FILING APPEAL BRIEF**

Pursuant to 37 CFR 1.17(f) the fee for filing the Appeal Brief is:

- ☐ small entity \$ 150.00
☒ other than small entity \$ 300.00

Appeal Brief fee due: \$300.00

4. **EXTENSION OF TERM**

Note: The time periods set forth in 37 CFR 1.192(a) are subject to the provision of § 1.136 for patent application. 37 CFR 1.191(d). Also see Notice of November 5, 1985 (1060 O.G. 27).

The proceedings herein are for a patent application and the provisions of 27 CFR 1.136 apply.

(complete (a) or (b) as applicable)

- ☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

| | Extension Months | Fee for other than small entity | Fee for small entity |
|--------------------------|---------------------|------------------------------------|-------------------------|
| <input type="checkbox"/> | one month | \$110.00 | \$55.00 |
| <input type="checkbox"/> | two months | \$380.00 | \$190.00 |
| <input type="checkbox"/> | three months | \$870.00 | \$435.00 |
| <input type="checkbox"/> | four months | \$1,360.00 | \$925.00 |
| Fee: | | | |

If an additional extension of time is required, please consider this a petition therefor.

(check and complete the next item, if applicable)

- ☐ An extension for _____ months has already been secured and the fee paid therefor of \$ _____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$ _____

or

- ☒ (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. **TOTAL FEE DUE**

The total fee due is:

Appeal Brief fee \$300.00

Extension fee (if any) \$ 0.00

TOTAL FEE DUE: \$300.00

6. **FEE PAYMENT**

☐

Attached is a check in the sum of \$ _____

☒

Charge **Account No. 09-0457** in the sum of **\$300.00**. A duplicate of this transmittal is attached.

7. **FEE DEFICIENCY**

NOTE: If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum, six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to charge the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, 1065 O.G. 31-33.

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If any additional extension and/or fee is required, this is a request therefor and to charge **Account No. 09-0457**.

AND/OR

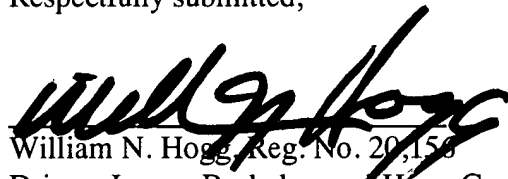
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If any additional fee for claims is required, charge **Account No. 09-0457**.

Respectfully submitted,

Date:

7/31/00



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Attachment

III. STATUS OF THE CLAIMS

Claims 1-12 have been allowed. Claims 21-25 and 34 have been rejected. This is a reissue application and claims 1-12 are the claims that are in the existing Patent No. 5,483,421.

IV. STATUS OF AMENDMENTS

No amendment has been filed subsequent to the final rejection.

V. SUMMARY OF THE INVENTION

Since this is a reissue application, the reference to the location of features in of the specification shall refer to the column and line number as the reissue is comprised, at least in part, of the patent cut-up and pasted and submitted in the issued column format.

The invention relates to a package for mounting integrated circuit chips onto a circuit board and a method of mounting integrated circuit chips onto a circuit board. According to the present invention, a conventional integrated circuit chip 20 is provided which has an array of input/output pads 22 on one side thereof to provide not only input/output signal connections to and from the chip but also power and ground connections. (column 6, lines 35-39) A chip carrier 24 is provided which has a top surface 26 and a bottom surface 28. The top surface 26 of the chip carrier 24 has an array of bonding pads 30 which are arranged in a pattern, which pattern corresponds to the pattern or foot print of the I/O pads 22 on the chip 20. The bottom surface 28 of the chip carrier 24 has a second set of bonding pads 32 which are connected to the set of bonding pads 30 by metal plated vias 34. (column 6, lines 44-55) Since the chip carrier 24 is larger than the chip 20, the spacing between the bonding pads 32 on the bottom surface 28 can be and normally is larger than the spacing between the bonding pads 39 on the top surface 26. This is referred to as a fan-out pattern.

(column 6, lines 62-66) The chip carrier 24 preferably is made of the same material as the circuit board. If the chip carrier is not fashioned from the same material as the board, it must, in any event, have a similar coefficient of thermal expansion; i.e. the difference in the coefficient of thermal expansion between the carrier and the circuit board should not vary more than about 20%. The chip carrier and the board are made from an organic dielectric material. In the preferred embodiment, both the chip carrier and the board are made of glass filled epoxy FR-4 material which has a thermal coefficient of expansion of about $17-20 \times 10^{-6}$ ppm/C. (column 7, lines 7-19) The chip 20 is mounted to the chip carrier 24 by means of solder balls 36 which interconnect the I/O pads 22 on the chip 20 to the bonding pads 30 on the top surface 26 of the chip carrier 24. Any conventional solder can be used. (column 7, lines 45-48) A circuit board 38 is provided which is preferably formed of the same material as the chip carrier 24 or at least formed of a material that has a similar coefficient of thermal expansion. The preferred material is an epoxy glass combination FR-4; but other materials such as polyimides which have similar properties can be used. (column 7, lines 55-61) The bonding pads 32 are then bonded to the bonding sites 42 by means of solder balls 44. The solder balls 44 can be any solder material. (column 8, lines 1-3) An encapsulation material 46, such as a quartz filled epoxy of the type described in U.S. Patent No. 4,825,284 can be used to protect and strengthen the solder connections between the device 20 and the carrier 24. (column 8, lines 11-14) By use of solder ball mounted chip carriers having a CTE matched to the board, several significant advantages are achieved over the use of ceramic carriers. These advantages include the ability to utilize relatively large chip carriers, if desired. By utilizing the via grid of printed wiring boards (typically 0.050"), a chip carrier with 600+I/O's can be only 36 mm square. Further, in the absence of thermal mismatch, the size of the solder balls 44 can be selected principally on current carrying requirements, not on structural strength requirements and, thus, can

be appreciably smaller. Solder balls can be placed closer together, further shrinking the attainable pitch and carrier size. (column 8, lines 17-28).

VI. ISSUES

The single issue involved here is whether a claim or claims which are intermediate in scope between the claims given up in prosecution and the claims allowed in a patent and which claims have not been considered in the original prosecution of the patent are properly rejected under the estoppel doctrine of recapture in a reissue application for broadening reissue properly filed less than two years after the issuance of the patent and wherein there is no intent to deceive.

VII. GROUPING OF THE CLAIMS

Claims 21 and 34 stand or fall together.

Each of claims 22-25 stands or falls individually and independently of each other.

VIII. ARGUMENT

First, and of absolute importance, is that each of the claims now in the reissue application is of a scope that was not considered during the prosecution of the application leading up to the subject patent. Claims broader in scope than claims 21-25 and claim 34 were considered and were either canceled or amended in the prosecution of the above entitled patent. Those amended claims are allowed claims 1-12 herein. But no claims of the scope herein presented were ever considered in the prosecution leading to the granting of the above entitled patent. Both claims 21 and 34 have the limitation therein of an encapsulating material encapsulating the solder connections of the bond pads on the chip carrier to the input/output pads on the chip. This does not appear in the claims as

originally filed. Thus, a claim of this scope was never considered. Therefore, it is submitted that no claims that have been the subject matter to prosecution and canceled are involved and, thus, no claims that were canceled are being recaptured. Expressed another way, it is not understood how a claim, the scope of which has never been considered during prosecution, can be recaptured.

In the final rejection, the examiner states:

“Claims 21-25 and 34 are rejected under 35 USC § 251 as being an improper recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. (citations omitted) A broadening aspect is present in the reissue which was not present in the application for patent. The record of the application of the patent shows that the broadening aspect (in the reissue) relates to subject matter that applicant previously surrendered during the prosecution of the application. Accordingly, the narrow scope of the claims in the patent was not an error within the meaning of 35 USC § 251, and the broader scope surrendered in the application for the patent cannot be recaptured by the filing of the present reissue application.”

While the factual statement by the examiner about the broadening aspect relating to subject matter that was previously surrendered during the prosecution of the application may be true, nevertheless this is not dispositive of the issue. In fact, a broadening reissue may very well include subject matter that was in a claim which has been previously canceled during prosecution. It is submitted that one cannot look at whether each particular element was present or absent in a claim when considering the doctrine of recapture but, rather, one must look to the claim as a whole to see what has been given up. The examiner acknowledges this fact and states:

“Claims 1 and 7, *as originally filed* in patent Application ‘467, correspond to Claims 21 and 34, respectively, of the instant Reissue Application except that Reissue claims 21 and 34 now each include the limitation ‘**an encapsulation material encapsulating said first set of solder connections.**’” (Emphasis original)

Thus, the examiner is admitting that claims of this scope have never been considered and never rejected. Therefore, it is not understood how the Applicants are being held to recapture a claim which has never been considered. The examiner further states:

“However, this limitation was not considered to be germane to the prior art rejection given in Application ‘467. This feature was taught by several references cited by Examiner Sparks during prosecution of Application ‘467.”

While this may be true, the question still must be answered as to whether the use of this encapsulation material in the structure or method being claimed is obvious since encapsulation material is shown with different types of substrates. It is submitted that Applicants have a right to have this issue considered, and have a right for the Patent Office to determine if this claim is unpatentable, and to respond to such determination. It should be noted at this point that the Applicants are not arguing the patentability of the claims; rather, Applicants are submitting that they are entitled to a decision by the examiner as to whether the claims are patentable or not and, if not, the references cited and the way the references are applied indicated so that the Applicants have an opportunity to respond.

The seminal case in this area is Ball Corp v. United States, 729 F.2d 1429 (Fed. Cir. 1984). The issue in this case was strikingly similar to that presented in the instant application. Thus, it is believed that a very brief review of the fact pattern and the holding in the Ball case would be instructive.

The invention in the Ball case was a connector for an aerial. In the preferred embodiment, the connection of the inner and outer cylindrical concentric conductive elements to the source was

accomplished by means of a single coaxial transmission feed line. In the first Office action, the examiner indicated that claims 1-8 which claimed but a single feed line would be rejected but indicated that claims 9 and 10 if limited to a plurality of feed lines would be allowed. The claims were amended and the examiner again suggested the allowability of the plurality of feed lines if presented in independent form. Following the second Office action, Ball added limitations to the claims requiring that a plurality of leads be connected to an edge of the outer conductor, and the patent issued with these limitations. Thus, Ball gave up claims to “at least one lead” being connected which would be broad enough to cover one or a plurality of leads and settled for a plurality of leads. Subsequently, Ball determined that it was entitled to claims broad enough to include the single feed line. Within the two year statutory period for broadening reissue, Ball filed a reissue application. Included in the reissue application were claims directed to a single lead line embodiment. In support of the reissue application, Ball stated that the original patent was partially inoperative because it claimed less than Ball had a right to claim, and Ball identified as error the undue limitation of the claims of the original patent to a plurality of feed lines.

There were two issues raised in this case. The first issue is whether the error alleged by Ball is sufficient as a matter of law under 35 USC § 251 to support reissue and, the second issue is whether Ball is estopped from securing, through reissue, claims covering the single feed line feature. In the instant application, the examiner has not raised an issue as to whether the Applicants are entitled as a matter of law to support the reissue but is raising the second issue as to whether Applicants are estopped from securing reissue based on but one feature of the claims. It is instructive to review the treatment of this issue in the Ball case by the court: “The government contends that Ball’s deliberate cancellation of the single feed line claims was not error. The act was taken to avoid a prior art rejection and, in the government’s view, the recapture rule bars Ball from

securing similar claims through reissue.” (1434) The government also contends that the deliberate nature of Ball’s acts stops Ball from securing similar claims through reissue. The court then goes on to state: “While deliberate cancellation of a claim cannot ordinarily be considered error, (citation omitted) the CCPA has repeatedly held that the deliberate cancellation of claims *may* constitute error if it occurs without deceptive intent. (citations omitted)” (1435) The court then states at page 1436: “Thus, the applicability of the recapture rule and the sufficiency of the error under Section 251 turn in this case, in the absence of other evidence of the patentee’s intent, on the similarity between the reissue and the canceled claims.” The court then states: “narrower reissue claims are allowable; broader reissue claims or reissue claims of the same scope as the canceled claims are not.” (1436) The court then states the rule very succinctly as follows: “Similarly, the focus is not as the government contends on the specific limitations of the elements of the claims but, rather on the *scope* of the claims. (citations omitted)” (1436) (Emphasis original) The court reinforced this on page 1437 stating: “The proper focus is on the *scope* of the claims and not on the individual feature or element purportedly given up during prosecution in the original application. The trial judge quite properly focused on the scope of the claims and we find no error in this respect. He determined that the reissue claims were intermediate in scope, broader than the claims of the original patent, yet narrower than the canceled claims.” (Emphasis original) The court then goes on to point out what features the reissued claim had. At page 1437 the court says “The reissue claims, in contrast, include limitations not present in the canceled claims: the cavity is filled with the dielectric material; an electric signal feed assembly replaces the feed means of the canceled claims.” The court does recognize that the reissue claims are broader in one respect in that the canceled claims are limited to an antenna of cylindrical configuration where the reissue claims are not so limited.” At 1438, the court stated: “Thus, the principle that a claim is broadened if it is broader in any

respect than the original claim serves to affect the bar of Section 251 against reissue filed later than two years after issuance of the original patent. In this case, Ball filed its application for reissue within the two year period for broadened reissue specified in Section 251.

“We know of no authority applying the above rule to reissue claims relative to the scope of canceled claims within the two year period for broadened reissue. Nor do we perceive the wisdom of such extension in the case. The rule is rigid and properly so in that it affects the express statutory limitation on broadened reissue. The recapture rule, however, is based on equitable principles. The rigidity of the broader in any aspect rule makes it inappropriate in the estoppel situation presented in this appeal.”

The court does say at page 1438 “Hence, we decline to apply that rule here where the broader feature relates to an aspect of the invention that is not material to the alleged error supporting reissue.” The court does not say that eliminating a limitation that was added to have the claims allowed is per se material. If that were the case, then the court would not have allowed the reissue claims since the reissue claims in the Ball case did, in fact, eliminate some of the very limitations included in the claims by amendment to obtain allowance. In the Ball case, the broadening aspect was directly related to the error, in that the claim was narrowed in error, just as in the instant case. Moreover, there was no intent to deceive in the Ball case, nor has the examiner alleged or found any intent to deceive in the instant case. Thus, just as the Ball case, in the instant case the broadening aspect is not material to the error alleged.

Each of claims 22-25 is dependent upon claim 21 and contains additional limitations. Since a claim of the scope of claim 21 was not considered, these claims could not have been considered and, thus, should be the subject matter of an Office action.

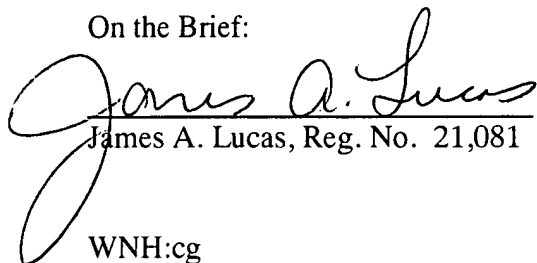
SUMMARY

Claims having the scope of independent claims 21 and 34 and dependent claims 22-25 were never considered by the examiner during the prosecution of the original patent, and there has been no allegation of deceptive intent. Therefore, the refusal of the examiner to enter these claims under the equitable doctrine of recapture is in error and should be reversed. This will, thus, provide the Applicants an opportunity to prosecute these claims on their merits before the Patent and Trademark Office.

Respectfully submitted,

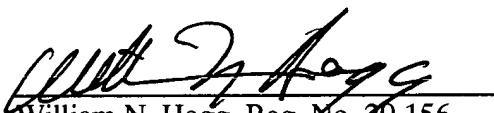
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APPENDIX

21. A package mounting integrated circuit chips onto a circuit board comprising:
- an integrated circuit chip having a surface array of input/output pads on one side thereof which array forms a footprint;
 - a chip carrier formed of an organic dielectric material having first and second opposite surfaces;
 - a first set of bonding pads formed on said first surface of the chip carrier and arranged in an array corresponding with the chip footprint;
 - a pattern of conductors on said chip carrier connected to accommodate said input/output pads;
 - a first set of solder connections interconnecting the input/output pads on the chip to said first set of bonding pads on the chip carrier;
 - an encapsulation material encapsulating said first set of solder connections;
 - a second set of bonding pads formed on the second surface of the chip carrier arranged in an array;
 - electrically conducting vias extend through the chip carrier connecting said first set of bonding pads to the second set of bonding pads;
 - a circuit board formed of an organic material having a coefficient of thermal expansion similar to the chip carrier;
 - a set of electrical connection sites formed on said circuit board and arranged in a pattern corresponding to the pattern of the array of the second bonding pads on said chip carrier;

a second set of solder connections interconnecting the pads of said second set of bonding pads on the chip carrier to the connection sites on the circuit board; and

wiring on said circuit board connected to said second set of bonding pads.

22. A package according to claim 21 wherein the thermal coefficient of expansions of the material of the chip carrier and the material of the circuit board do not differ by more than about 20%.

23. The package of claim 21 wherein said chip carrier and said circuit board are formed of the same material.

24. A package according to claim 21 wherein said chip carrier is formed of a glass filled epoxy.

25. A package according to claim 21 wherein said chip carrier is formed of a polyimide.

34. A method of mounting integrated circuit chips onto a circuit board comprising:
providing an integrated circuit chip having a surface array of input/output pads on one side thereof which array forms a footprint;

providing a chip carrier formed of an organic dielectric material having first and second opposite surfaces;

forming a first set of bonding pads formed on said first surface of the chip carrier and arranged in an array corresponding with the chip footprint;

providing a pattern of conductors on said chip carrier connected to accommodate said input/output pads;

forming a first set of solder connections interconnecting the input/output pads on the chip to said first set of bonding pads on the chip carrier;

encapsulating said first set of solder connections;

forming a second set of bonding pads formed on the second surface of the chip carrier arranged in an array;

forming electrically conducting vias extend through the chip carrier connecting said first set of bonding pads to the second set of bonding pads;

providing a circuit board formed of an organic material having a coefficient of thermal expansion similar to the chip carrier;

forming a set of electrical connection sites on said circuit board and arranged in a pattern corresponding to the pattern of the array of the second bonding pads on said chip carrier;

forming a second set of solder connections interconnecting the pads of said second set of bonding pads on the chip carrier to the connection sites on the circuit board; and

forming wiring on said circuit board connected to said second set of bonding pads.